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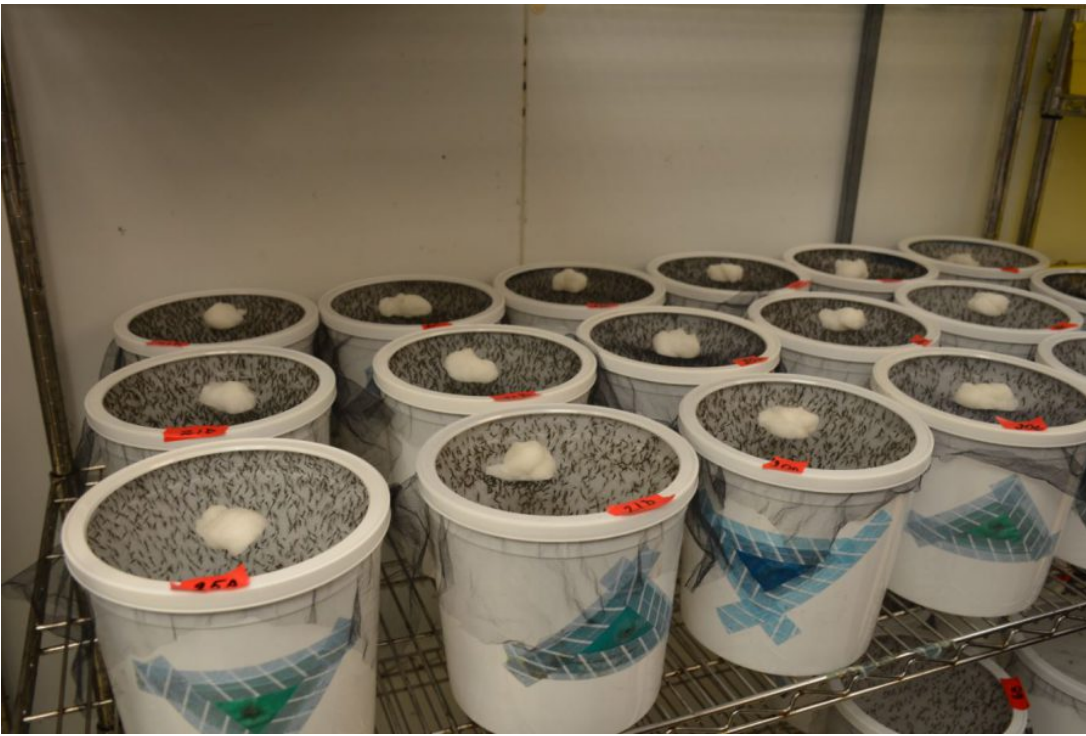
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[Mosquito Research Aids Vaccine Development](#)

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By Naval Medical Research Center public affairs



Mosquitos bred in the Walter Reed Army Institute of Research (WRAIR) insectary in Silver Spring, Maryland, to help develop vaccines to fight malaria. (Photo courtesy of NMRC Public Affairs)

Mosquitos are everywhere and can be hard to avoid. Through the research conducted at the Naval Medical Research Center (NMRC), mosquitos play a vital role in successful vaccine development.

Mosquitos can spread many diseases including dengue, West Nile Virus, Zika virus and malaria. Entomologists like Lt. Cmdr. Roxanne Burrus, Ph.D., working for NMRC's Infectious Disease Directorate (IDD), use mosquitos for research to help develop new vaccines for malaria, dengue and Zika virus.



Lt. Cmdr. Roxanne Burrus (left), entomologist at the Naval Medical Research Center (NMRC), and Dr. Lindsey Garver (right),

senior research scientist for the entomology branch of the Walter Reed Army Institute of Research (WRAIR), showcase some of the mosquitos used to develop vaccines in the WRAIR insectary in Silver Spring, Maryland. (Photo courtesy of NMRC Public Affairs)

“Many mosquito-borne diseases do not appear to be circulating heavily in the U.S. at this time, although with climate change and global travel patterns of humans and shipments of goods, the potential for that occurring in the future is a concern, we are seeing this now with the concerns related to the Zika virus,” says Burrus.

Mosquito-borne diseases cause debilitating symptoms and could prevent military personnel from completing their mission. Vaccines can protect individuals from becoming infected or reduce the severity of infection if administered prior to being bitten.

According to Burrus, in the case of malaria, mosquitos are used in a laboratory setting to grow batches of malaria sporozoites which are used in studies to develop and test potential vaccines.

The malaria parasite life cycle involves two hosts. During a mosquito blood meal, a malaria-infected female *Anopheles* mosquito inoculates sporozoites into the human host. Sporozoites infect liver cells and mature into schizonts, which rupture and release merozoites into the blood stream.

“NMRC coordinates closely with the overseas labs through the year and provides support to the labs by assisting them to focus on the most relevant infectious diseases in each overseas laboratory’s region,” says Burrus.

“NMRC also sends researchers to visit overseas labs so that we can better understand the research project, interact with collaborating host-nation organizations, and develop plans of action to overcome any challenges that might be faced by an overseas lab,” said Burrus.

The overseas labs which are part of the Navy Medicine R&D enterprise are the U.S. Naval Medical Research Center – Asia in Singapore (NMRC-A) with a detachment in Phnom Penh; the U.S. Naval Medical Research Unit No. 3 in Cairo, Egypt; and the U.S. Naval Medical Research Unit No. 6 in Lima, Peru (NAMRU-6) with a satellite laboratory in Iquitos, Peru.



Lt. Cmdr. Roxanne Burrus (left), entomologist at the Naval Medical Research Center (NMRC), and Dr. Lindsey Garver (right), senior research scientist for the entomology branch of the Walter Reed Army Institute of Research (WRAIR), working with mosquitos in the

WRAIR insectary in Silver Spring, Maryland. (Photo Courtesy of NMRC Public Affairs)

The Department of Defense (DoD) has made the development of vaccines to combat mosquito-borne illnesses a top priority, pointed out Burrus. The Military Infectious Disease Research Program (MIDRP) publishes a list of the most important military diseases which is frequently modified to reflect changes in assessed risk levels.

“Malaria and dengue top MIDRP’s list of the infectious diseases that are of highest military importance,” says Burrus. “NMRC and its overseas laboratories are continuing efforts to develop vaccines for such illnesses. Research on Zika virus vaccines is in its initial stages.”

When it comes to controlling mosquito populations, Burrus says mosquitos become resistant to pesticides over time, so it is important to constantly develop and test new products for use during military, humanitarian and public-health emergency situations.

For service members and civilians alike, the best defense is to avoid mosquito bites. For service members, using the DoD Insect Repellent System provides the best protection from mosquito bites. It incorporates application of permethrin repellent on the uniform, application of DEET or picaridin repellent on exposed skin, and emphasizes properly worn uniforms and sleeping inside a permethrin-treated bed net.

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